Nikon

AUTO Refractometer NR-5500

Repair Manual

Nikon

NIKON CORPORATION

TOKYO, JAPAN

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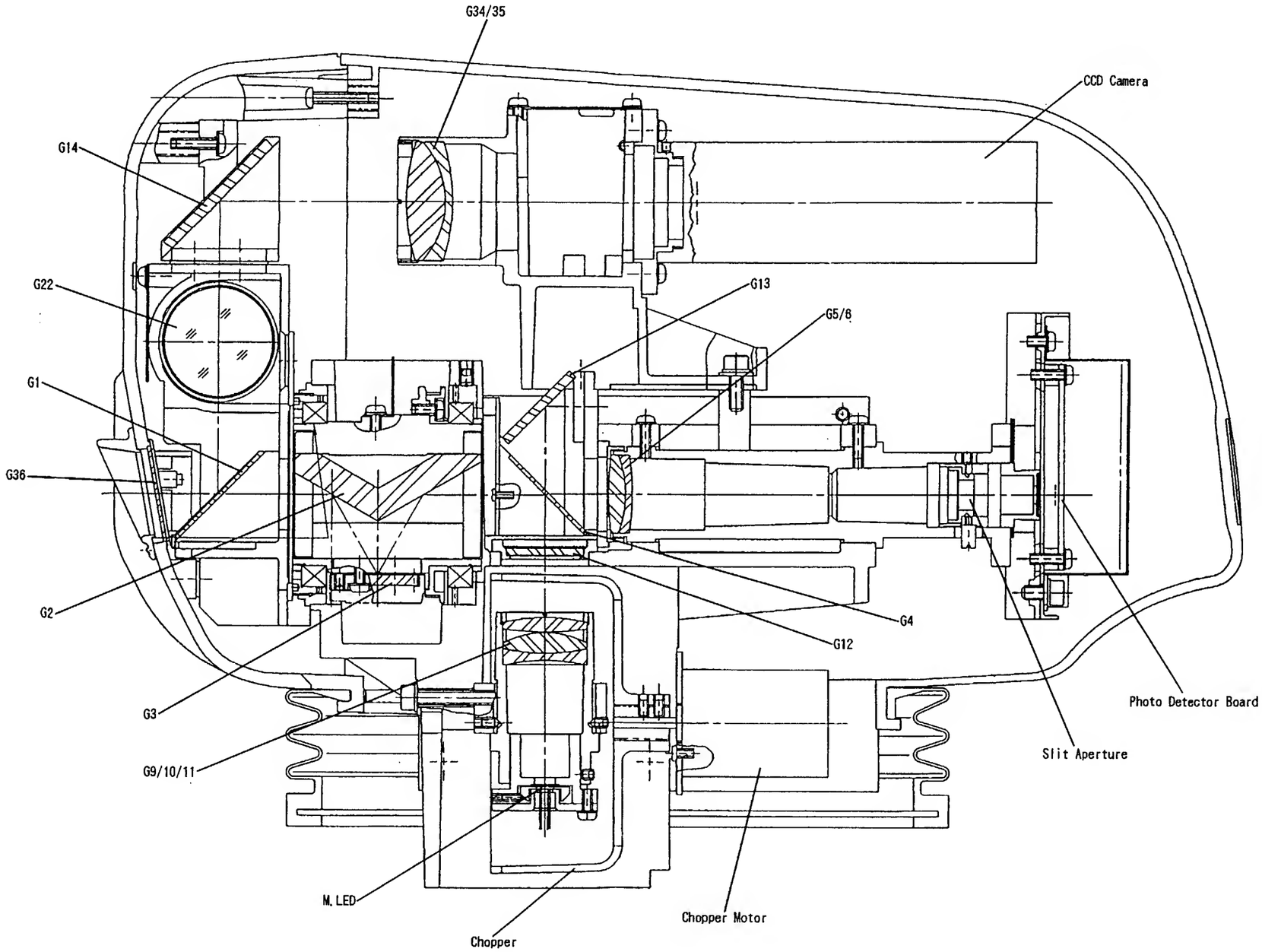
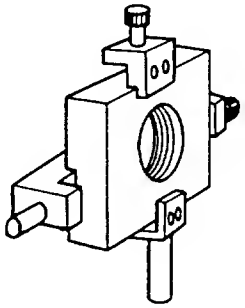
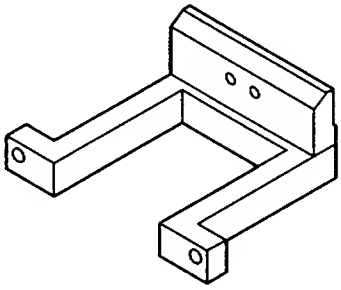
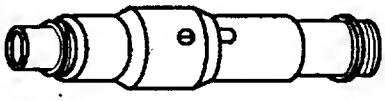
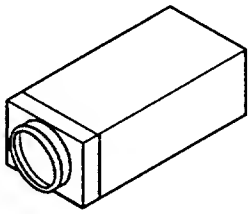
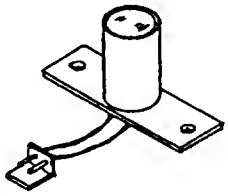
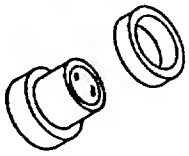
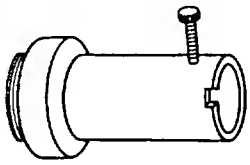
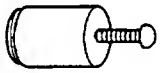
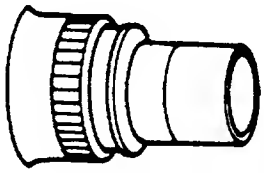
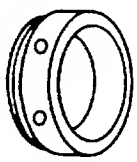
(1) NR-5500 Optical System

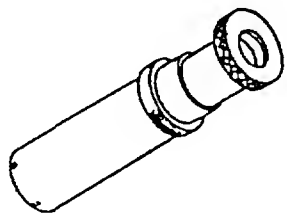
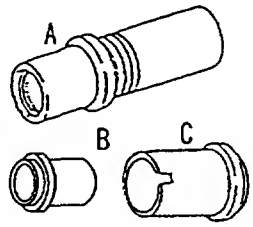
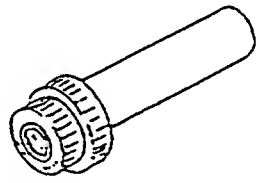


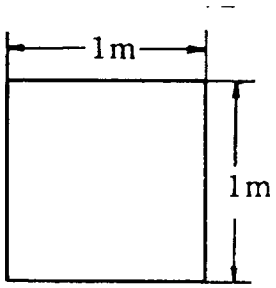
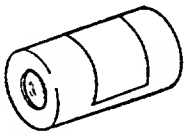
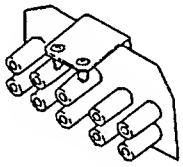
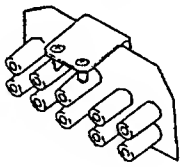
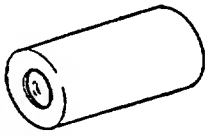
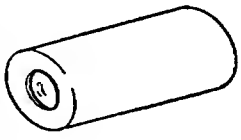
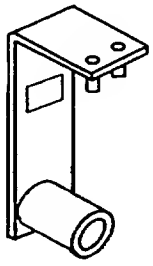
DDA20600 NR-5500

〔3〕 NR－5500 Repair tool list

Tool number Name	Sketch	Remarks
J－35056 Centering tool		Use with J-38075 Centering tool attachment
J－38075 Centering tool attachment		Use with J-35056 Centering tool Useful for NR-5100 & NRK-8000
J－38054A Optical adjustment TV tool		For C mount TV camera
J－38054B TV camera (NTSC type & C mount)	 With DC12V power supply cord & BNC cable	Use with J-38054A Optical adjustment TV tool
J－38057 LED illuminater	 A pair of Infrared ray LED for TV tool & Visibler ray LED for eyepiece	Use with J-38075 Centering tool attachment

Tool number Name	Sketch	Remarks
J－38055 Supplement lens set	 For Slit diaphragm & Chopper slit	Use with J-38054A Optical adjustment TV tool or J-35050 Eyepiece with reticle
J－35058 Model eye attaching tool		Use with J-35056 Centering tool
J－35058A Model eye adapter		Use with J-35058 Model eye attaching tool
J－35050 Eyepiece with reticle (15×)		Use with J-35057 Eyepiece retaining ring and J-35056 Centering tool
J－35057 Eyepiece retaining ring		Use with J-35050 Eyepiece with reticle and J-35056 Centering tool

Tool number Name	Sketch	Remarks
J－38053 Centering telescope		Use with J-35057 Eyepiece retaining ring and J-35056 Centering tool
J－39011 Inspecting telescope holder	 A:for J-39014 Inspecting tele. B:for J-35058A Model eye ada. C:For J-39011A Holder	Use with J-35056 Centering tool
J－39014 Inspecting telescope		Use with J-39011A Inspecting telescope holder A and J-35056 Centering tool
J－39015 Inspecting lens (－10Dpt.)		Use with J-3911A Inspecting telescope holder A
J－39016 Inspecting lens (＋10Dpt.)		Use with J-39011A Inspecting telescope holder A

Tool number Name	Sketch	Remarks
J－35066 Blackout curtain		
J－39029 Model eye for Main LED power check		Use with J-35058A Model eye adapter and J-35058 Model eye attaching tool
J－39033 Model eye set	 0.00Dpt. ～+20.00Dpt. 13 pieces  －2.00Dpt. ～－20.00Dpt. 12 pieces	Also use with J-35058A Model eye adapter and J-35058 Model eye attaching tool
J－38052A High power model eye ±22.00Dpt.	 +22.00Dpt.  －22.00Dpt.	Use with J-35058A Model eye adapter and J-35058 Model eye attaching tool
J－38056 Cly. model eye		

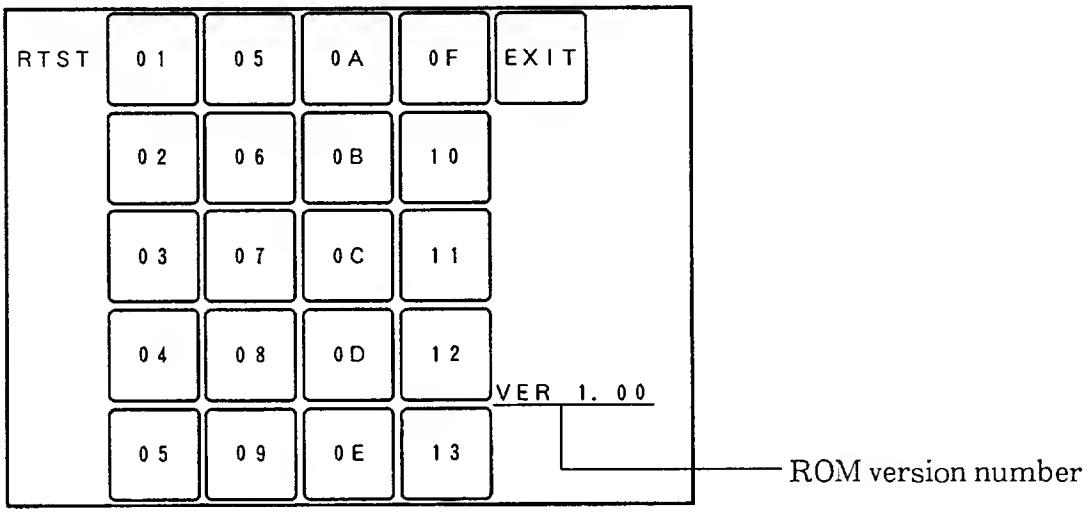
〔6〕 TEST PROGRAM

1 . Entering the Test Program Mode

① After turning on the Main switch, press the [PRINT] key while the sound "do, mi, so, do" is being heard.

② After you hear the sound "do, mi, so, do, do, so, mi, do" followed by three beeps, press the measurement button three times in succession.

③ The NR - 5500 will enter the test program mode and display the test program select menu screen. (The NR - 5500 will display the ordinary measurement mode screen if you do not press the key at the proper time.)



2 . Exiting the test mode

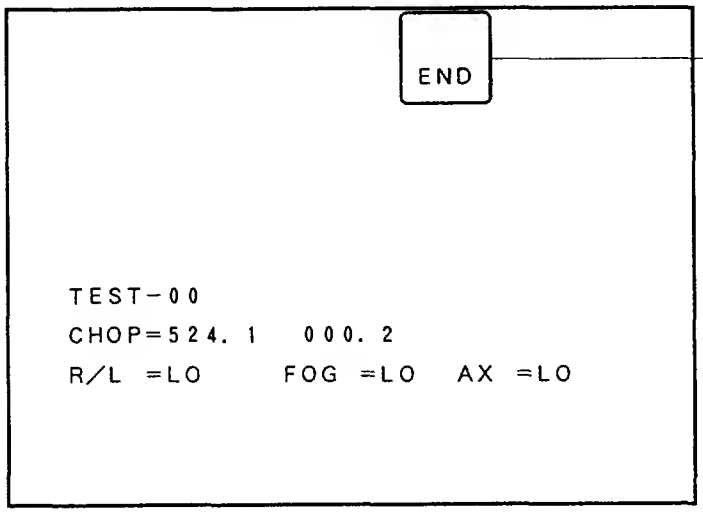
Press the [EXIT] key in the refractometer test mode select screen, and the NR - 5500 will exit the test mode and enter the measurement mode with the ordinary measurement mode screen.

3 . Refractometer Test Items

TESTNo.	Description	Remarks	Adjustment
0 0	Check chopper frequency and R/L. FOG and AX sensors.	CHOP=524 ±1.0 Light occlusion = LO	
0 1	Turn on M. LED. Rotate IRM.	MLED ON: M. LED lights up continuously. IRM ROT: Rotates continuously.	
0 2	Not used.		
0 3	Adjust alignment mark.	TOT=80～85: Dust-proof glass is installed. TOT=90～95: Dust-proof glass is not installed.	VR3 GAIN
0 4	Turn on C. LED. Turn on M. LED.	CLED ON: C. LED lights up continuously. MLED ON: M. LED lights up continuously.	
0 5	Not used.		
0 6	Measure count offset value. Measure CHA-FIL. CHB-FIL peak values.	PHASE COUNT OFFSET=-200～+200 CHA=CHB=150 ～200 0 V=000	
0 7	Not used.		
0 8	Check monitor background color.	Measurement switch	
0 9	Test printer operation.	[PRINT] key	
0 A	Adjust automatic fogging target position.	+: PRINT switch -: Joy stick(measurement button)	
0 B	Adjust key display position.		
0 C	Making of model eye count table.	Use the model eye set (-18D~ +22D).	
0 D	Adjust alignment offset.	Set to T = R±10. Set to X = R±10. Set to Y = R±10. R＝1 2 0～1 3 5 A＝B＝1 5 0～2 0 0 0＝0 0 0	VR6 TOT VR5 XAL VR4 YAL VR7 CAL
0 E	Check a measurement system.	[X] [Y] = 60 when checking [X] [Y] = 30 when adjusting	
0 F	Initialize memory.	When EEPROM is replaced.	
1 0	Check touch panel switches.	Verify that the switches can be turned on and off normally.	
1 1	Adjust cylindrical axis offset.	Use J38056 cylindrical model eye.	
1 2	Check IC card reader/writer.	Valid only when an IC card reader/writer is built-in.	
1 3	Selection model eye mode and human eye mode.	HUMN EYE = Human eye MODL EYE = Model eye +1.00～−1.00 Dpt.	

6 . Test Item Description

① TEST - 00 : Displaying the chopper frequency and its variation, as well as R/L, FOG and AX sensor status information

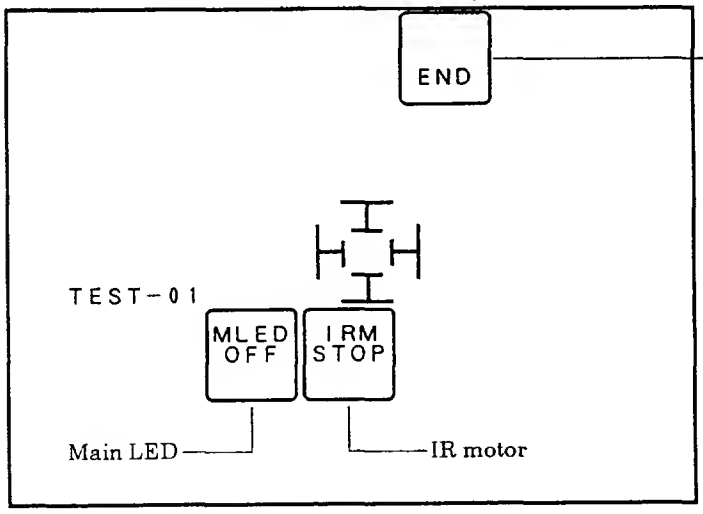


Press this key to quit TEST - 00.

• Chopper frequency: CHOP=524.1 000.2
Chopper frequency variation
Chopper frequency: OK if 524.0 ± 1.0 is obtained.

• R/L, FOG and AX sensors
L O (Low) : The sensor light is cut by the sensor plate.
H I (High) : The sensor light is not cut by the sensor plate.

② TEST - 01 : Turning on the main LED and rotating the IRM (image rotator motor) continuously



Press this key to quit TEST - 01.

• Turning on the main LED (M. LED)
Press the [MLED OFF] key to change the display into [MLED ON], and the M. LED will turn on continuously. Press the [MLED ON] key again to change the display into [MLED OFF], and the M. LED will go off.
Keep the LED on for as short a time as possible because extended LED lighting will shorten the LED life.

• Continuous IRM rotation

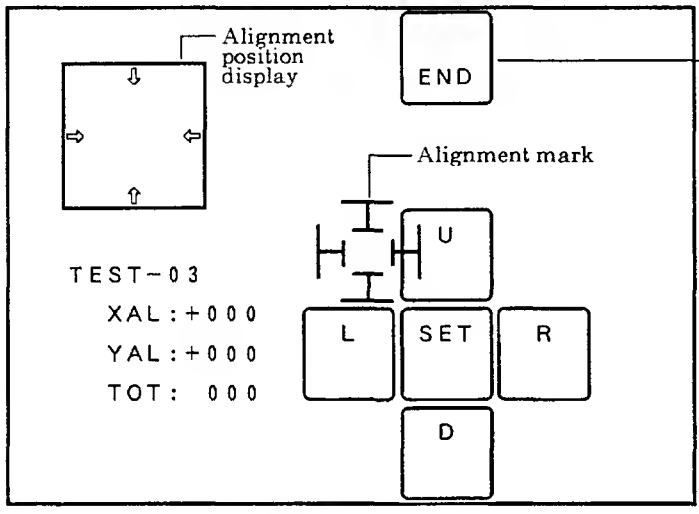
Press the [IRM STOP] key to change the display into [IRM ROT], and the IR motor will rotate continuously. Press the [IRM ROT] key again to change the display into [IRM STOP], and the IR motor will stop.

* * * When a motor have been stopped and noised because of the depth of gearing, set the power to OFF once and start to rotate again.

* * * After turning on the M. LED and rotating the IR motor, make optical adjustments on the IR (image rotator), and check the accuracy of the rotation and the position of the photo detector unit.

Connect the oscilloscpe to TP18 (XAL) and TP17 (YAL).

③ TEST - 03 : Model eye alignment and adjusting the alignment mark position



• Adjusting the model eye position

Adjust the position of the model eye tool installed on the centering tool so that the following readings are obtained:

XAL = +000 YAL = +000

TOT = 093 approx. (OK if read - out is between 60 and 105)

Adjust the center position roughly while referring to the position of the asterisk "*" mark in the alignment position display located at the upper left corner.

(Set the focus point to the fifth graduation of the scale in the model eye attaching tool.)

Finally, install the dust - proof glass and adjust VR3 GAIN until TOT=080 ~085 reading is obtained.

• Adjusting the alignment mark position

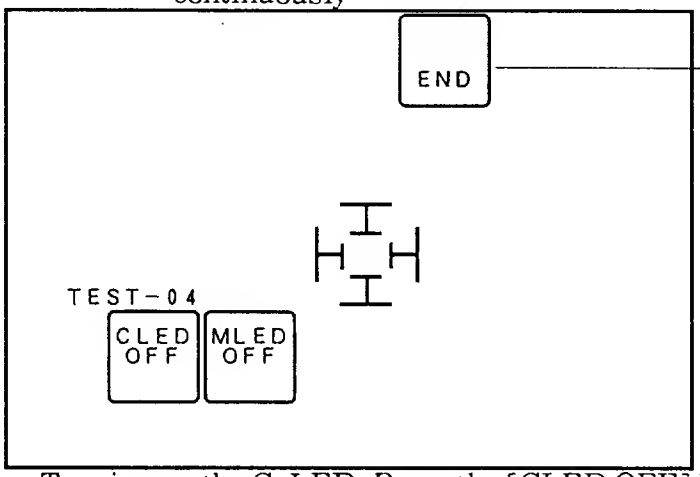
After adjusting the model eye position, do the following if the blinking dot of the M.LED is misaligned slightly from the alignment mark:

Move the alignment mark vertically with the [U] and [D] keys and horizontally with the [L] and [R] keys until the blinking dot of the M. LED falls at the center of the alignment mark.

After the adjustment is complete, turn DIP switch No. 5 located on the right side of the Main body to the ON position and press the [SET] key.

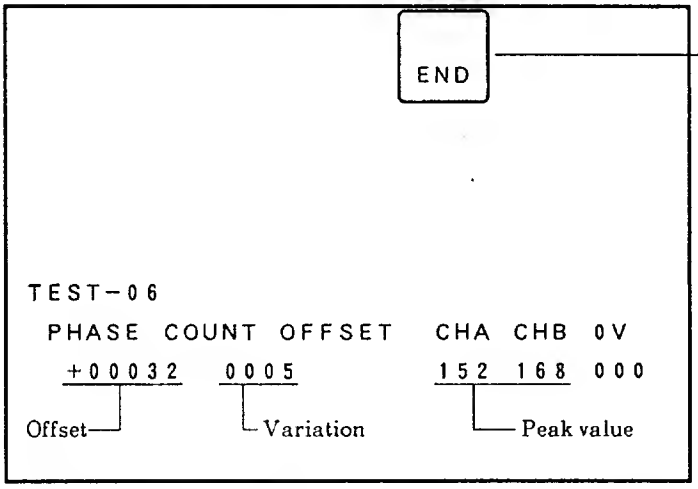
The alignment mark position is then stored in the EEPROM and the message "SET DIP SW5 TO OFF" is displayed. Return DIP switch No. 5 to the OFF position.

④ TEST - 04 : Turning on the C. LED (Calibration LED) and M. LED (Main LED) continuously



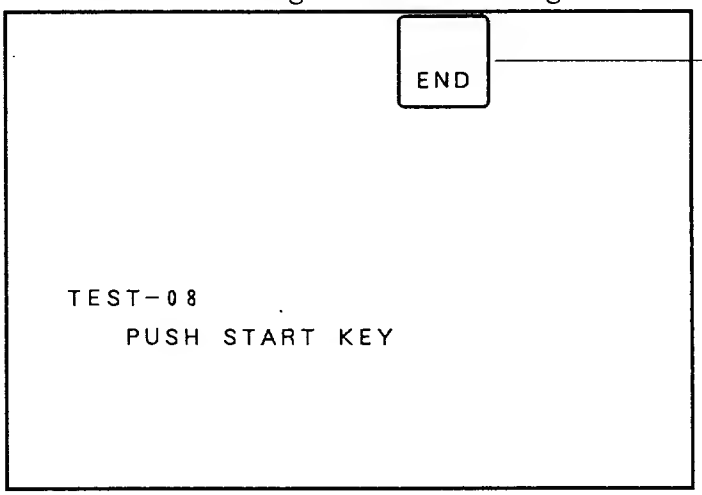
- Turning on the C. LED: Press the [CLED OFF] key to change the display into [CLED ON], and the C. LED will light up. This mode is used to check the CHA and CHB signals.
- Turning on the M. LED: Press the [MLED OFF] key to change the display into [MLED ON], and the M. LED will light up cotinuously. This mode is used to adjust the position of the M. LED.

⑤ TEST - 06 : Displaying the CHA and CHB phase count offsets and the CHA - FIL and CHB - FIL signal peak values



- Displaying the CHA and CHB phase count offsets
  This test displays the digital read - out of the phase difference offset after A/D conversion is made when the C. LED is on. Make sure that the following readings are observed:
  Offset: - 00200 to +00200 ; Variation: 0010 or less
- Displaying the CHA - FIL and CHB - FIL signal peak values
  This test displays the digital read - out of the peak values of the CHA - FIL and CHB - FIL signals after A/D conversion is made when the C. LED is on.
  CHA: 150 to 200 ; CHB: 150 to 200
  Adjust VR7 CAL until the reading of the CHA - FIL and CHB - FIL peak values falls between 150 to 200.
  (it is advisable that this adjustment be carried out during TEST - 0D)
- 0V display: Make sure that the level measured is 000. If read - out is not 000, the A/D converter is damaged.

⑥ TEST - 08 : Checking the monitor background color

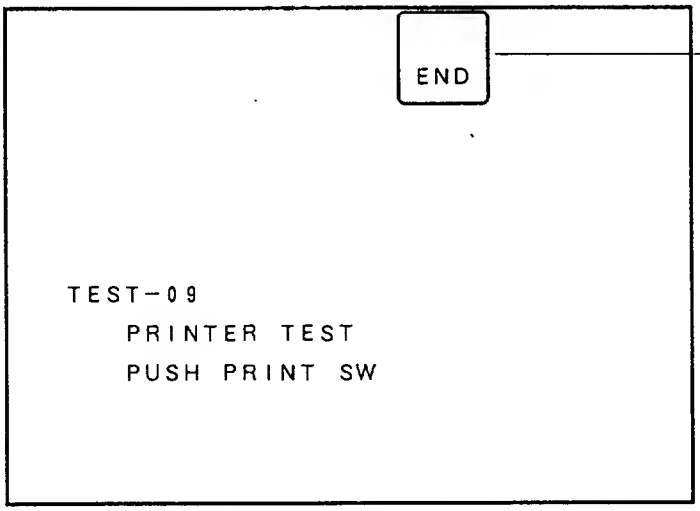


- The background color of the monitor should change on each press of the measurement button.

→ Transparent (video) ⟶ Black ⟶ White →

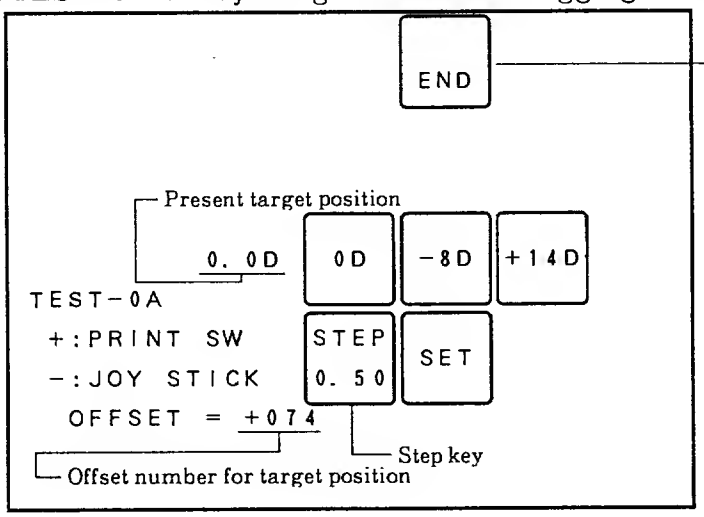
Transparent: Raw signal from the camera.
Black : The screen background is set to black by the black level signal.
White : The screen background is set to white by the white level signal (characters vanished in the background).

⑦ TEST - 09 : Testing the printer



- Press the [PRINT] key, and the NR - 5500 will print 8 lines of data.
  This test is used to check the printer (e.g., for missing characters) and to check the print darkness.
  To adjust the print darkness, use the VR1 on the CPU board, and then turn the Main switch off and on to make the new setting valid.

⑧ TEST-0A : Adjusting the automatic fogging mechanism



• Positioning the automatic fogging target

Mount J39014 subjective inspection telescope and adjust the amount of offset to the 0.00Dpt. position of the fogging target.

While observing the fogging target with the J39014, move it with the [PRINT] key and measurement button (Joy stick) until the target position becomes clearly visible. Select the 0.12 Dpt. step with the [STEP] key and adjust the offset.

[PRINT] key : Moves the fogging target in the plus diopter direction.
Measurement button (Joy stick) : Moves the fogging target in the minus diopter direction.
[STEP] key : Adjust the increment by which the fogging target moves.

→ 0.50D → 0.25D → 0.12D →

The distance of the fogging target travel is the offset amount (number of pulses) and is displayed in the format "OFFSET = ***."

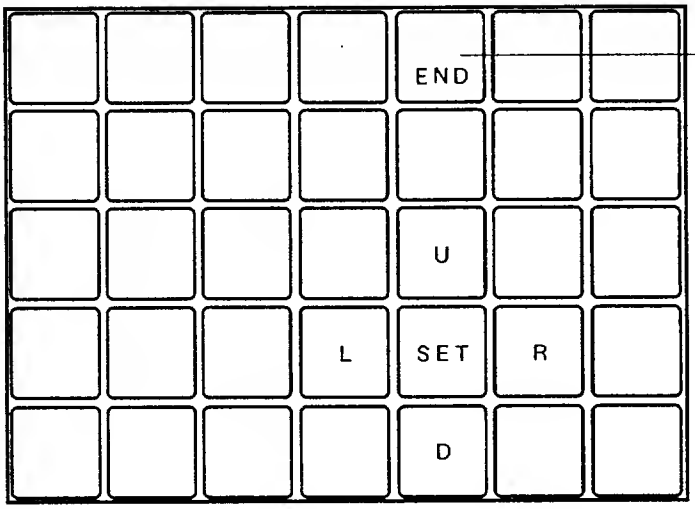
After establishing the offset, turn DIP switch No. 5 located on the right side of the Main body to the ON position and press the [SET] key. The offset amount is then stored in the EEPROM and the message "SET DIP SW5 TO OFF" is displayed. Return the DIP switch No. 5 to the OFF position.

• Checking the fogging target movement

(The [PRINT] key and measurement button can not be used)

[- 8D] key: Pressed to move the fogging target to the -8.00Dpt. position.
[+14D] key: Pressed to move the fogging target to the +14.00Dpt. position.

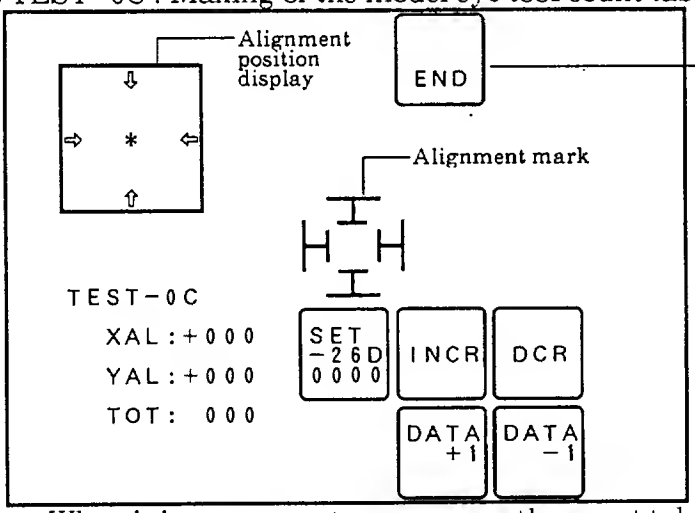
⑨ TEST - 0B : Adjusting the key display positions



Press this key to quit TEST - 0B.

- Adjust the discrepancy between the working area of the keys on the monitor touch panel and the key position displayed on the screen.
  [U] and [D] keys: Move the key display vertically.
  [L] and [R] keys: Move the key display horizontally.
  After adjusting the key display position, turn DIP switch No. 5 located on the right side of the Main body to the ON position and press the [SET] key. The offset amount is then stored in the EEPROM and the message "SET DIP SW5 TO OFF" is displayed. Return DIP switch No. 5 to the OFF position.

⑩ TEST - 0C : Making of the model eye tool count table



Press this key to quit TEST - 0C.

- When it is necessary to remeasure the count table data for the model eye after making optical adjustments on the auto refractometer unit, perform measurements on the model eye tool concerned and restore the new count table to memory (EEPROM).
- Selecting the model eye
  [INCR] key : Changes the power of the model eye tool displayed on the [SET] key by 2.00Dpt. to plus side.
  [DCR] key : Changes the power of the model eye tool displayed in the [SET] key by 2.00Dpt. to minus side.

The NR - 5500 can show model eye tool power from - 26.00Dpt. to +26.00Dpt. in 2.00Dpt. step.

→ −26.00 ⟷ −24.00 ⟷ −22.00 ⟷ −20.00 ⟷ • • • • • • • 0.00 ←
→ +26.00 ⟷ +24.00 ⟷ +22.00 ⟷ +20.00 ⟷ • • • • • • • +2.00 ←

• Model eye alignment

Place the model eye tool of the selected power on the centering tool and align it.

Focusing : Adjust the focus by pushing or pulling the J35058 model eye attaching tool which installs the model eye.

Alignment: While observing the alignment mark, make a rough alignment of the model eye position by turning the centering knob of the centering tool until the asterisk * mark is positioned near the center of the display. Then make a fine alignment while observing the "XAL:" and "YAL:" displays to obtain "XAL: +0.00" and "YAL: +0.00" respectively. Make sure that "TOT: 09 3 or a similar value is also displayed.

• Measuring the model eye count

When you press the measurement button, the image rotator rotates and the count is automatically measured. The measured count is displayed in the [SET] key. Use the [DATA] key to change the displayed count or manually set the count.

[DATA +1] : Increments the counter by 1.

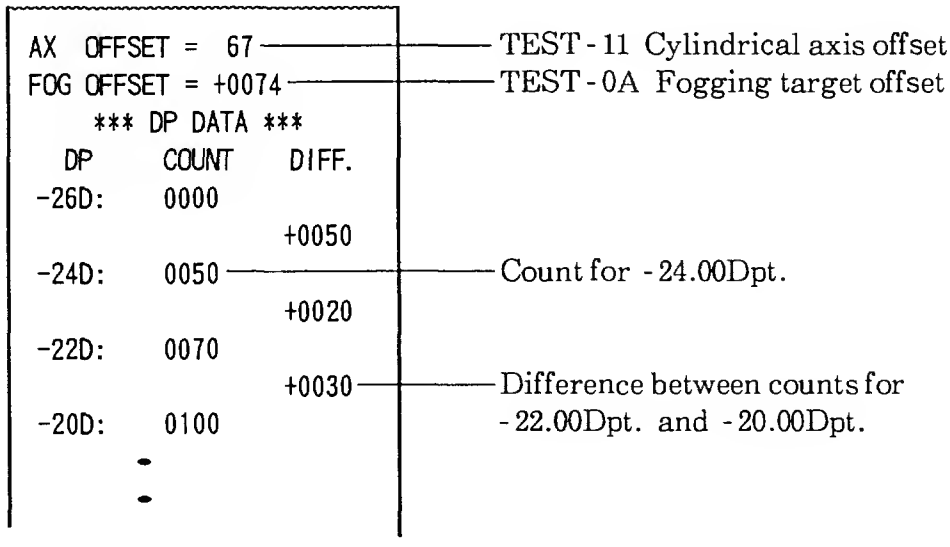
[DATA -1] : Decrements the counter by 1.

• Saving the model eye count

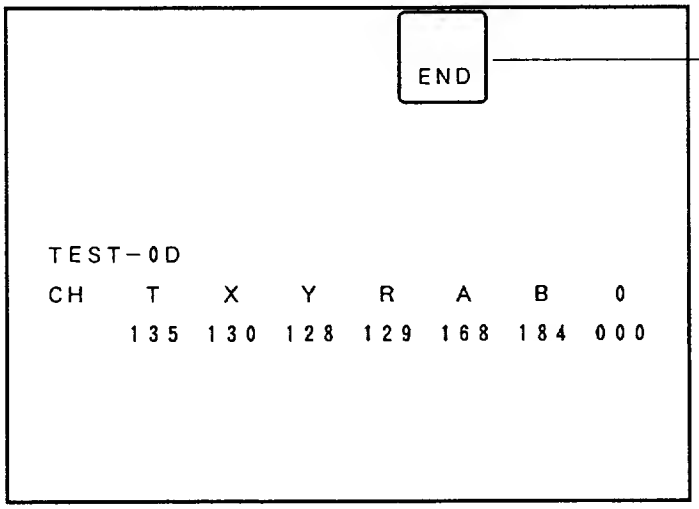
After establishing the count, turn DIP switch No. 5 located on the right side of the Main body to the ON position and press the [SET] key. The count is then stored in EEPROM and two short beeps are heards.

* Press the [INCR] key and select -18.00Dpt.. (-26.00Dpt., -24.00Dpt., -22.00Dpt.,+24.00Dpt. and +26.00Dpt. are out of measurement range. So they are not necessary to calibrate.)
Start counting at -18.00Dpt. After the storage of the count for -18.00Dpt. is complete, press the [INCR] key and select -16.00Dpt.
Then measure and store the count for -16.00Dpt.
Continue measurement sequentially up to the measurement of +22.00Dpt.. After storing all counts for measured model eyes, turn DIP switch No. 5 to the OFF position.

Press the [PRINT] key, and the count values stored in the EEPROM will be printed.

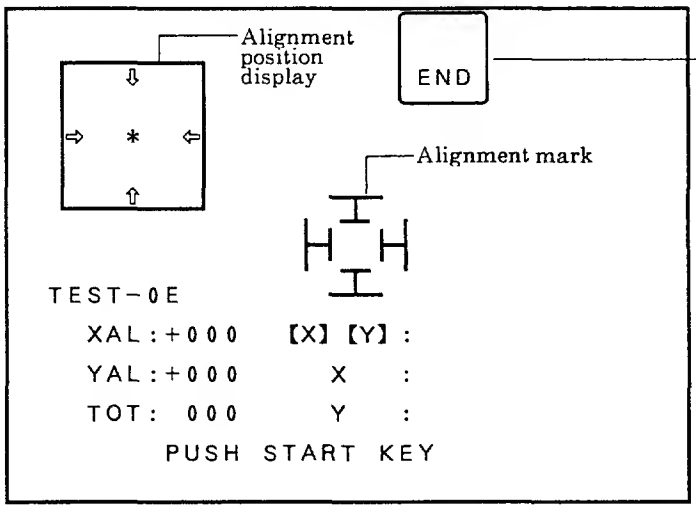


⑪ TEST - 0D : Alignment offset adjustment



- Adjusting the alignment signal offsets (with no room lamp)
  "T": Offset of the TOT signal caused by the amplifier system
  Adjust VR6 TOT to set " R ± 10".
  "X": Offset of the XAL signal caused by the amplifier system
  Adjust VR5 XAL to set " R ±10 ".
  "Y": Offset of the YAL signal caused by the amplifier system
  Adjust VR4 YAL to set " R ±10 ".
  "R": Reference voltage level for the alignment signal (2.5V)
  Make sure that the reference voltage is between 120 and 135 (not adjustable).
- Adjusting the peak value of CHA - FIL and CHB - FIL.
  "A": Peak value of the CHA - FIL signal when the C LED is on.
  Make sure that the peak value is between 150 and 200.
  "B": Peak value of the CHB - FIL signal when the C LED is on.
  Make sure that the peak value is between 150 and 200.
  * To adjust "A" and "B" use VR7 CAL to measure the peak values for both channels so that they fall within the permitted value range (same as in TEST - 06).
- 0V display
  "0": Make sure that "000" is displayed.

⑫ TEST - 0E : Checking the measuring optical system adjustment



- TEST - 0E can be used to test the accuracy of adjustments made on the measuring optical system (Image rotator and photo sensor)
- Model eye alignment

  Place the model eye tool on the centering tool and align it.

  Focusing : Adjust the focus by pushing or pulling the J35058 model eye attaching tool which installs the model eye.

  Alignment: While observing the alignment mark, make a rough alignment of the model eye position by turning the centering knob of the cenrering tool until the asterisk "*" mark is positioned near the center of the display.

  Then make a fine alignment while observing the "XAL:" and "YAL:" displays to obtain "XAL: +0.00" and "YAL: +0.00" respectively.

  Make sure that "TOT: 093" or a similar value is also displayed. If this value is not displayed, adjust the VR3 GAIN control.
- Measurement

  When you press the measurement button, the Image rotator rotates and measurement starts. The asterisk "*" mark in the alignment mark moves around and the "XAL:" and "YAL:" values change as the Image rotator rotates.
- Displaying the measurement results

  The NR - 5500 displays the total of the alignment offsets measured at 72 measuring points at the 5 degrees steps.

  [X][Y]: Totals of alignment offsets in X and Y directions

  At checking : 50 or less

  At adjustment: Adjust so that the total will be 30 or less.

  X : Total of alignment offsets in X direction only

  Y : Total of alignment offsets in Y direction only

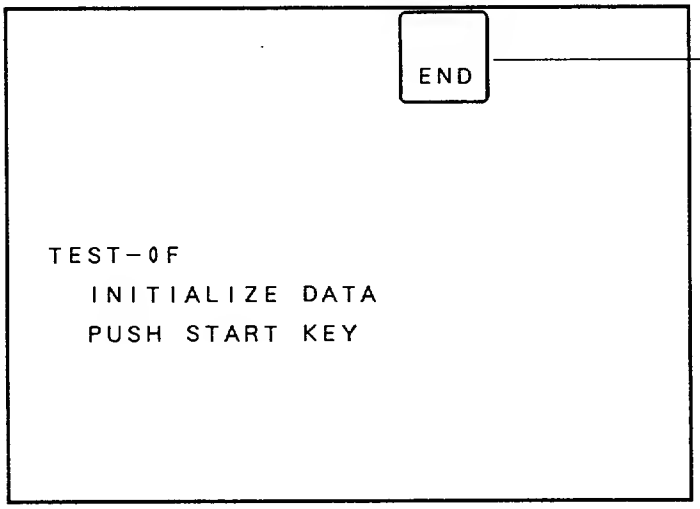
  * Calculation formula

$$[X]\ [Y] = \frac{1}{64} \sum_{i=1}^{72} \left(|Xi| + |Yi| \right)$$

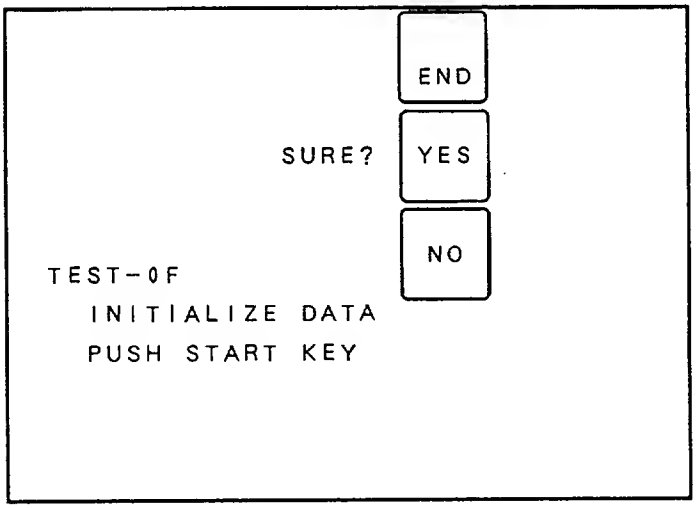
$$X = \frac{1}{64} \sum_{i=1}^{72} Xi \quad \text{(Signed)}$$

$$Y = \frac{1}{64} \sum_{i=1}^{72} Yi \quad \text{(Signed)}$$

⑬ TEST - 0F: Initializing memory (EEPROM)



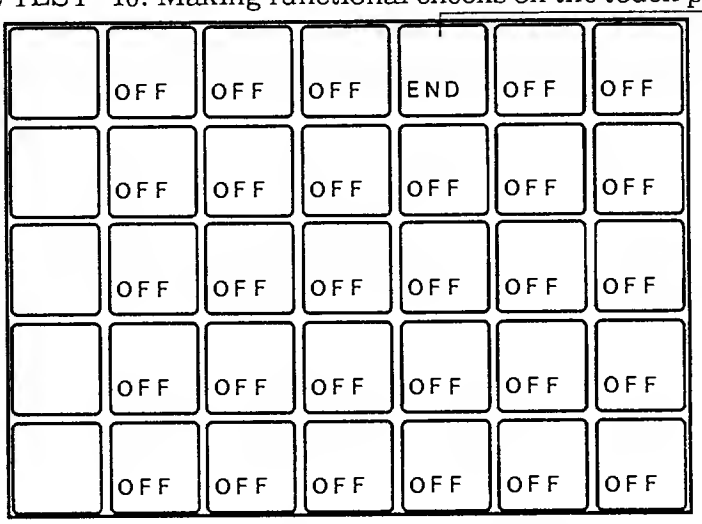
- This test initializes the EEPROM that stores the model eye count tables and offset values by storing their system standard values. This test must always be conducted whenever the EEPROM is replaced with a new one.
  * Accidental execution of this test will overwrite all existing data with standard values, resulting in accuracy deterioration in any subsequent measurements.
- Initializing EEPROM
  Press the measurement button, and the confirmation screen will appear.



[YES] key : Press this key after setting DIP switch No. 5 on the right side of the main body to ON to start initializing the EEPROM.
When initialization is finished, "SET DIP SW5 TO OFF" is displayed.
Return DIP SW No.5 to the OFF position.

[NO] key : Press this key to cancel the initialization test.
The NR - 5500 will then quit TEST - 0F.

⑭ TEST - 10: Making functional checks on the touch panel keys

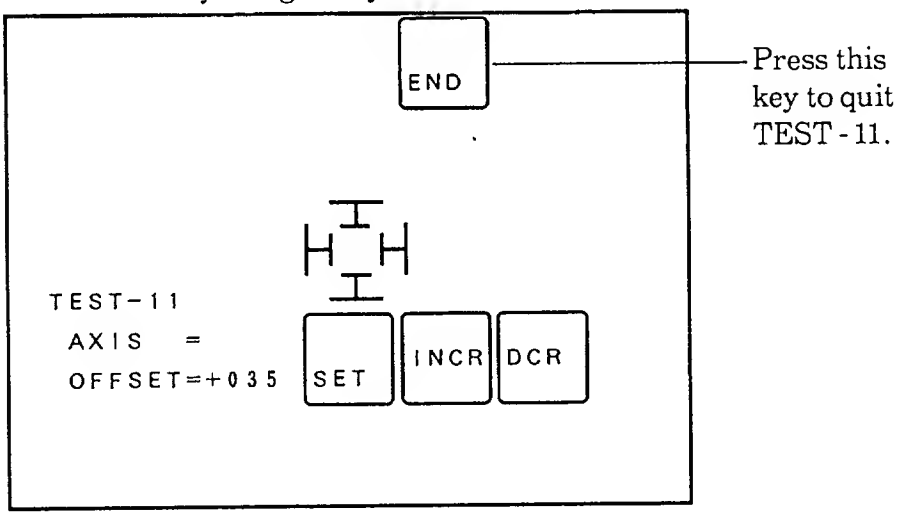


- This tests permits the user to check the touch panel keys for normal operation.
- Checking the key function

  Press the key to be checked. The key is normal if the corresponding display switches from OFF to ON. The END key is normal when the NR - 5500 quits TEST - 10 normally.

  * TEST - 0B may also be executed in conjunction with this test to check the position of the key display frame.

⑮ TEST - 11: Adjusting the cylindrical axis offset



- Model eye alignment adjustment

  Place J38056 astigmatism model eye tool on the chin rest.

  Focusing : Focus the blinking dot of the M LED by sliding the Main body forwards or backwards.

  Positioning: Move the Main body by sliding and elevating until the blinking dot of the M LED is positioned at the center of the alignment mark.

  * Perform focusing and position alignment simultaneously. Before installing the astigmatism model eye tool, clean it with cleaner liquid.

- Measuring the cylindrical axis

  Press the measurement button to start measurement. The measured cylindrical axis is displayed in the "AXIS=" field.

• Adjusting the cylindrical axis

Using the [INCR] and [DCR] keys, adjust the cylindrical axis displayed in the "AXIS=" field matches the cylindrical axis value displayed on the mounting holder of J38056 astigmatism model eye tool.

[INCR] key: Increases the cylindrical axis by one. The value displayed in the "OFFSET=" field is also increased.

[DCR] key : Decreases the cylindrical axis by one. The value displayed in the "OFFSET=" field is also decreased.

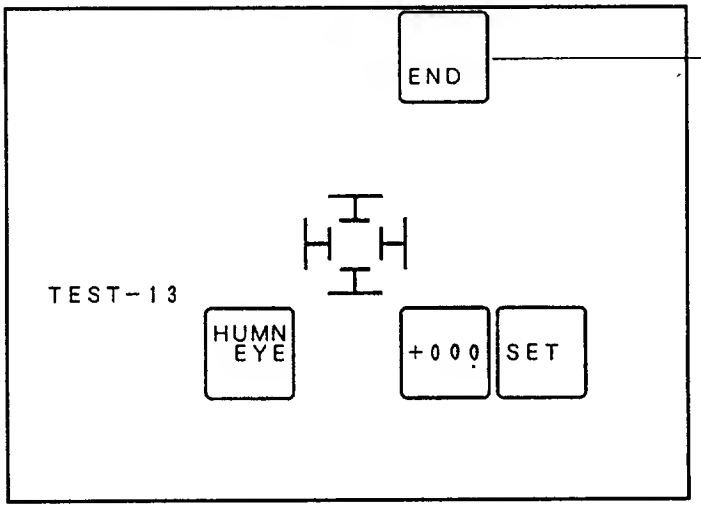
* * * Set a cylindrical axis sign to +C.

• Saving the offset value

When the offset value displayed in the "OFFSET=" field simultaneously during the cylindrical axis adjustment is established, set DIP switch No. 5 to ON and press the [SET] key.

The offset value will then be stored in the EEPROM and two short beeps will be generated. Then reset DIP switch No. 5 to OFF.

⑯ TEST - 13 : Selection of the model eye mode and human eye mode and parallel shifting of the spherical power



• Selection of the model eye mode and human eye mode

[HUMN EYE] : Must be selected to measure the human eye and model eye provided with the instrument (normal measurement mode).

[MODL EYE] : Must be selected to measure the model eye tools during measurement accuracy test.

Press the [End] key to return to the refractometer test program select screen and press the [EXIT] key to enter the normal measurement mode screen.

The "R/L" display on the normal measurement mode screen will turn to "M". Now you can measure the model eye tool accurately.

* After the model eye tool measurement is complete, turn the Main switch off and on to return to the normal human eye measurement mode.

• Parallel shifting of the spherical power

Use this test to shift the measured spherical power parallel.

[+000] key: Used to select the shifting amount. Each press of this key changes the power displayed on the keytop.

→ [+000] → [+012] → [+025] → [+037] → • • • • → [+100] ┐
0.00D +0.12D +0.25D +0.37D +1.00D
└ [-012] ← • • • • ← [-062] ← [-075] ← [-087] ← [-100] ←
-0.12D -0.62D -075D -0.87D -1.00D

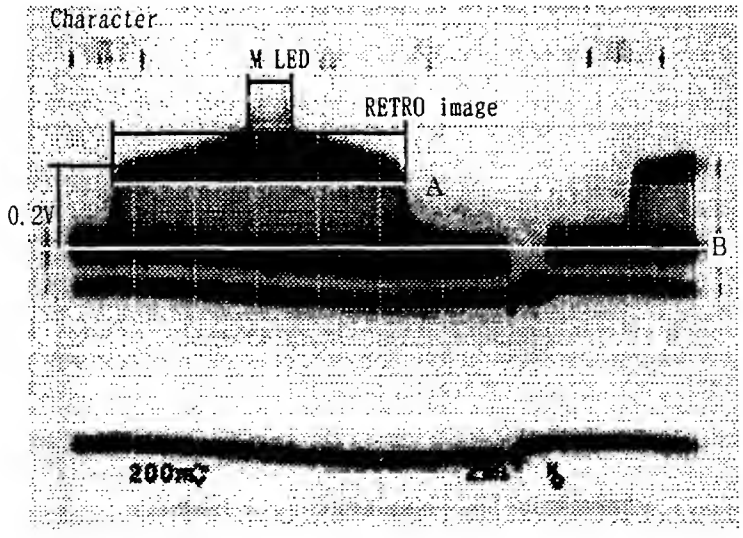
After establishing the shifting amount, turn DIP switch No. 5 located on the right side of the Main body to the ON position and press the [SET] key.
The amount of parallel shifting will then be stored in the EEPROM and two short beeps will be heard. Then return DIP switch No. 5 to the OFF position.

5 .RETRO mode (RETRO image brightness adjustment)
At RETRO mode, screen image brightness and anterior illumination intensity canbe adjusted.

① Connect cables.
- Using co - axial cable tool
  Connect the auxiliary monitor output (J3) on the CPU board and the CHANNEL 1 on a oscilloscope.
- Using oscilloscope's probe
  Connect a probe to No.1 pin at J3 connector.
  Connect a ground cable to No.2 pin at J3 connector.
  * Do not make a short circuit to prevent from a CPU damage.

② Oscilloscope setting
- Use a CHANNEL 1.
- Each setting as follows.
  SEC(TIME)/DIV ——→ 2 ms or 5 ms.
  VOLTS/DIV ——→ 0. 2 V AC.

③ Preparation for NR - 5500
- Attach a front cover. Unit must have the dust protection glass.
- Mount a model eye on a forehead rest bar.
- Align a model eye correctly.
- Get a regular measuring mode and then set a RETRO mode with pressing the [RET] key.



④ Pre - adjustment of signal
- Press the [PRINT] key or measuring switch to put out the anterior illumination.
- Adjust the TRIGGER LEVEL on oscilloscope to freeze a signal.
  ** When adjusting a signal, get a continuous anterior illuminating with pressing the measuring switch.
- In case the boundary (line A) is tilted.
  Make the boundary (line A) a level with slight height adjustment by turning a Joystick handle.
- Align the middle of pedestal part (line B) with the vertical center of co - ordinate axis on oscilloscope screen using the POSITION knob.

⑤ Calibration of image brightness inside a pupil
- Set a shoulder part of pupil image signal to 0. 2 V±0. 0 2 V (1 grad±0. 1 grads) with adjusting a VR 1 on small board mounted on the REF board in the measuring head.
  (Increase the signal by counterclockwise)
  ** Keep a continuous lighting by pressing measuring switch for the brightness adjustment.)

⑥ Anterior illumination light setting
- Press the [PRINT] key and put on the anterior illumination.
- Set the auxiliary control knob for monitor's contrast and brightness to be face the flat part up. (Open the printer paper cover)
- Set the anterior illumination LED's intensity properly with adjusting the VR 2 on the REF board.
  (Increase the intensity by clockwise)
  When pressing the [PRINT] key each time, anterior illumination repeats a blinking.
  At this time, set the illumination intensity to be the maximum without the distortion of the character and camera images on monitor.

〔7〕 PROTECT DATA SETTING

1 . Protect Data (Initialization Data)

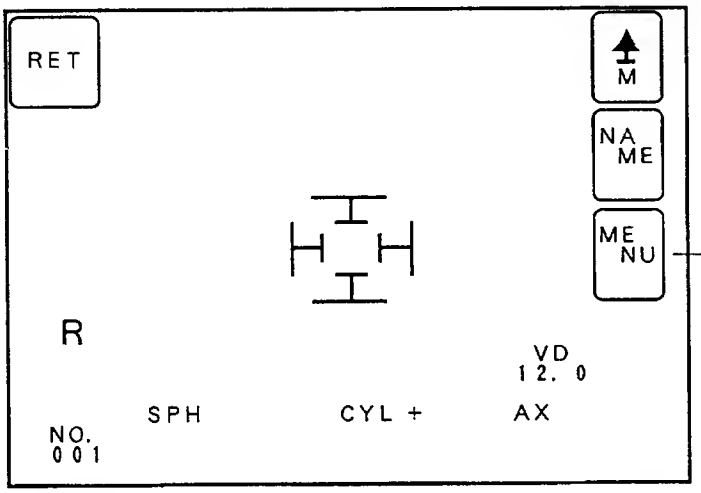
The NR - 5500 stores essential operating data such as correction and initialization data in EEPROM. The data necessary for NR - 5500 initialization is called protect data .

The protect data is divided into the following three types:

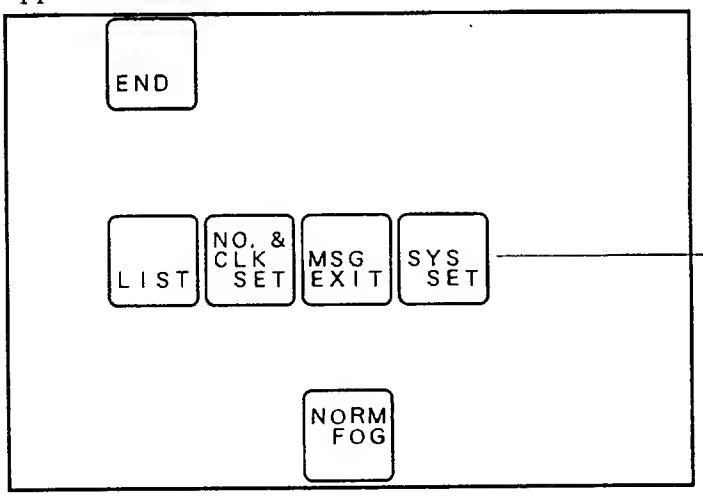
① External communication mode data
② Built - in IC card reader/writer mode data
③ Language data

2 . Setting up Protect Data

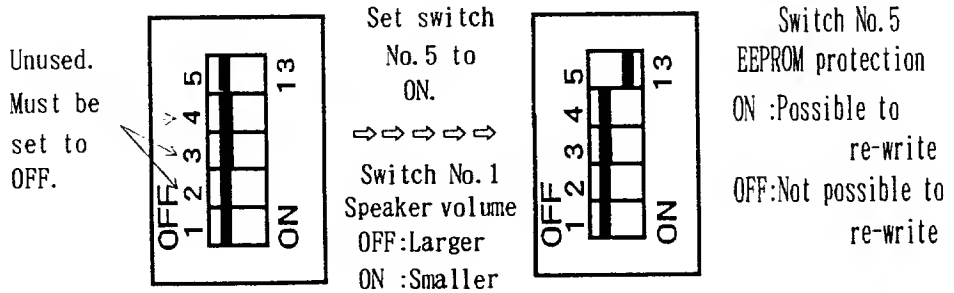
① Press the [MENU] key in the measurement mode to display the menu screen.



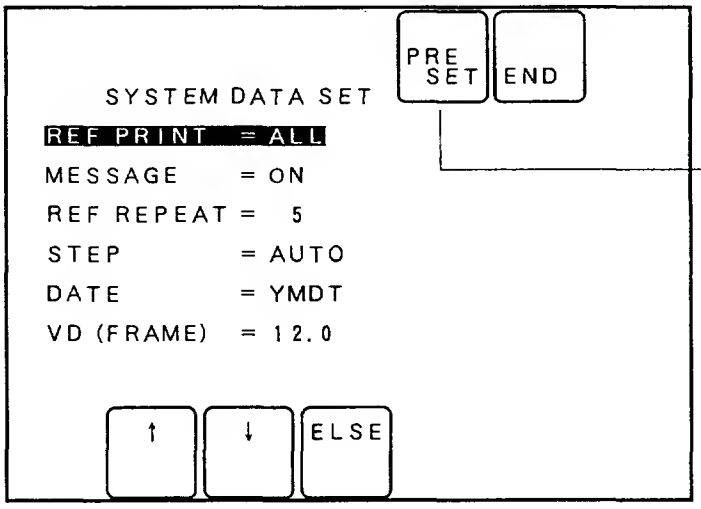
② Press the [SYS SET] key in the menu screen, and the system data setup screen will appear.



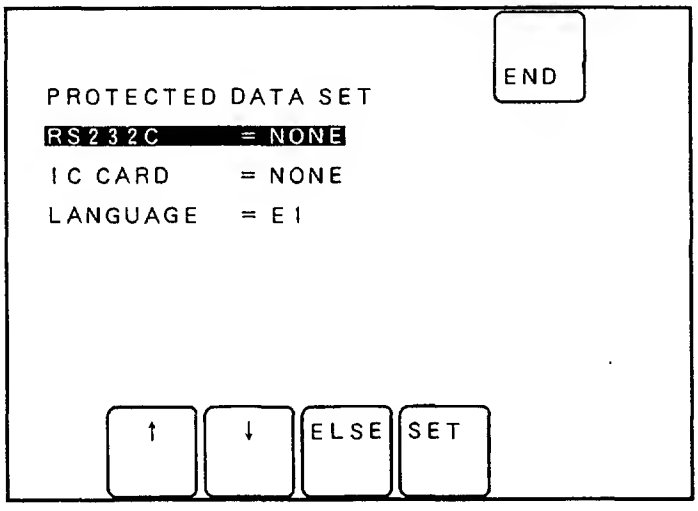
③ Remove the blind cover on the right side of the Main body and set DIP switch No. 5 to ON.



④ Find the [PRE SET] key displayed to the left of the [END] key in the system data setup menu.



⑤ Press the [PRE SET] key on the screen, and the protect data setup menu will appear.



Using the [↑] and [↓] keys, select the desired item and set the corresponding data with the [ELSE] key.

* Description of Protect dada

(1) RS-232C : Setting up the external communication mode.
- =NONE : No communication (Select this when not connected)
- =NNKI : Transmit data in new NK mode on request from external device.
- =NNKE : Transmit data to external device in new NK mode on each end of measurement (triggered by "Print" switch).
- =NK : Transmit data in old NK mode (same as NR-5000).

(2) IC CARD : Setting up the built-in IC card reader/writer
- =NONE : No IC card reader/writer is built-in.
- =NNK : Program data into IC card in new NK mode.
- =NK : Program data into IC card in old NK mode.

(3) LANGUAGE: Defining the language used

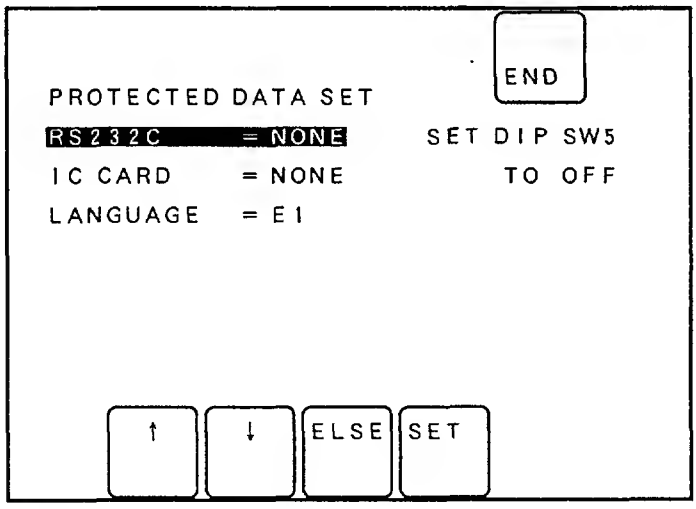
JP : Japan	E1: English	
E2 : English (with GR special charactor support)		
GR: German	FR: French	SP : Spanish
IT : Italian	SW: Swedish	DM: Denmark
TR: Turkey	NR: Norwegian	DU : Dutch
PR: Portuguese	HN: Hungarian	PL : Polish
IN : Indonesian	GK: Greek	

* : The system data setup screen options VD and DATE are not available when JP is selected.
  VD=12.0 DATE=YMDT are always set.
* : Special characters such as Ä and Ö are not supported in the E1 mode. Only genuine English characters are allowed.

* : Special characters such as Ä and Ö are allowed in ordinary English messages in the E2 mode.
* : The (language - specific) words that are displayed differently depending on the language selected include: SPH, CYL, AX, VD, PD, R, L and Title of Name(e.g., Mr.).

⑥ After setting up the above three items, press the [SET] key and the settings will be stored in EEPROM.

⑦ Set DIP switch No. 5 to OFF and press the [END] key to return to the measurement screen.



The message "SET DIP SW5 TO OFF" will be displayed if you press the [END] key without setting DIP switch No. 5 to OFF.
In this case, set DIP switch No. 5 to the OFF position so that the NRK - 8000 will return to the measurement screen mode.